

THURSDAY, SEPTEMBER 12, 1889.

THE TECHNICAL INSTRUCTION ACT.

IN the Speech from the Throne at the close of the session, Her Majesty is made to express satisfaction, *inter alia*, with "the steps you have taken towards the establishment of technical education in England and Wales," and perhaps the words here placed in the Queen's mouth will do as well as any others to express the feeling with which the Government Bill was regarded by the friends of technical instruction all over the country, and by those who for years past have laboured in the cause. Steps have been taken "towards" the establishment of technical education in England and Wales, not very complete or large steps, but still steps which show that the Government, when time and opportunity arise, are prepared to go further, and which pledge the present Ministry, at any rate, to secondary technical instruction. That the new Act goes no further is not necessarily due to any lukewarmness on the part of the Vice-President of the Council or of his colleagues. The circumstances of the past few years were such that a very large amount of legislation had to be proposed, and if possible carried, during the session just ended; and any Government would naturally desire to avoid all contentious subjects except those which imperatively called for treatment. Unfortunately, nothing is easier than to revive in certain quarters in the House of Commons the heated educational controversies of twenty years ago; there are still some men whose blood is fired by these antique battle-cries, and who think it their duty to ride forth to a war in which there is nowadays no real enemy. We think that the friends of technical instruction have every reason to be grateful to a Government which, with many inducements to do nothing, have yet brought in and passed a Bill which, with Sir Henry Roscoe's amendments, was supported by all the members of the Royal Commission on Technical Instruction who had seats in the House of Commons. But, we hear it said, the Bill is a very poor and small measure, while the subject is one to be dealt with by a large, comprehensive, and elaborate enactment; the principle of the administration is all wrong, for it divides technical education from the ordinary education of the country,—it should be administered by the School Boards and by the School Boards only; it is mere paltry, tinkering legislation where it might be heroic, and so on. No doubt in the best of all possible worlds the matter would be different, but here below we have to take things as we find them; and amongst the things which we find, is a legislative machine which labours heavily and slowly, and which has to be manipulated with a hundred and one different considerations in view. The House of Commons is far, indeed, from being an ideally perfect assembly for dealing with technical education or any subject of the kind; but in this, as in most other matters in this country, where compromise governs in all things, from the position of the Queen on the throne downwards, the question is not what we ought to have, but what we can get. Things do not spring full-grown from the brain of the British Jove; we do not get complete,

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exhaustive, elaborate legislative enactments from the British Parliament; finality is never written on any of its proceedings; it never seeks theoretical perfection. First we get one small inadequate measure; by and by this is enlarged, amended, improved, supplemented, by a succession of Acts, spread, it may be, over years, and perplexing lawyers and administrators by their inconsistent and contradictory provisions; then last of all comes a reforming official who elaborates all these scattered Acts into one homogeneous statute, which he succeeds in getting through Parliament just as the whole becomes useless in consequence of some new policy or wave of public opinion; and then the process is all gone through again. As to the objection respecting the authority administering the Act, we must confess we cannot attach any weight to it, in comparison with the substantial concession to the demand for technical instruction which it makes. It seems to us that it can matter very little which particular one of our numerous local authorities is to be the medium for passing on to the public the benefits conferred by the Act. No doubt the work is more within the scope of the School Boards; but to refuse those benefits because, for reasons which are perfectly well understood by those who have followed the discussion, they come from County and Borough Councils and rural sanitary authorities, would be absurd pedantry—almost a crime. One member of the House of Commons was filled with dismay at the prospect of the rural and urban sanitary authorities raising technical institutes out of the public funds, although he quite approved of technical instruction. It does not appear that a technical institute will be any the worse because the money with which it is maintained will be raised by a number of men with one long name rather than a number with another long name: the public gets the institute all the same. Moreover, this point is rendered of little or no importance, even in itself, by the present position of local government in this country. It is now in a transition stage; most of the existing machinery which has not already been taken to pieces will certainly have to undergo that process in the course of the next few years, and we feel no assurance at all that School Boards themselves will not shortly disappear, to be replaced by Education Committees of County and Borough Councils, as existing sanitary authorities will be supplanted by Sanitary Committees and sub-committees. From this point of view, even if a great question of principle were otherwise involved, it would not matter much which set of authorities undertook the task, seeing that all are likely to be equally short-lived, and to be merged soon in the County or Borough Councils, as the case may be. What satisfies those true friends of our national progress who have made this subject their own in Parliament, and who are in specially favourable positions for judging what is attainable, will probably satisfy most other sensible advocates of technical instruction. In common phrase, the Act is "something to go on with"; it is even more, because it is a pledge that the Government will go further in due time. In an excellent and well-considered article on the subject, the *Times* (September 4) says it "remains for us to make the best use of the system about to be established, to take note of the

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dangers and drawbacks incidental to it, but not to forget the limitless possibilities for good which it offers," and further, "almost without a struggle is established the possibility of a complete national system of technical instruction." It is for this that we have reason to be thankful to the Government: it has placed the instrument in our hands, and it is for us now to use it efficiently.

CAMBRIDGE MATHEMATICS.

A History of the Study of Mathematics at Cambridge.

By W. W. Rouse Ball. (Cambridge: University Press, 1889.)

AUGUSTUS DE MORGAN, writing more than fifty years ago, says that "the literary history of this country requires separate and minute accounts of the rise of science in Oxford, in Cambridge, and in the north of England, which should severally end (if it might be no later) with Wallis, Newton, and Thomas Simpson."¹ To what extent this long-felt want has been supplied by other publications, we cannot tell; but we know of none readily accessible to the student of mathematical history, and therefore hail with satisfaction the appearance of the small octavo volume which is the subject of our review.

What we should call the study of mathematics at Cambridge is of comparatively recent origin: for, although Seth Ward "brought mathematical learning into vogue in the University, . . . where he lectured his pupils in Master Oughtred's 'Clavis,'"² the first Mathematical Professor there was Isaac Barrow (Ward's junior by about twelve years), and the lectures of his illustrious successor were so ill attended that M. Bertrand says: "Il professa trente ans à Cambridge sans y former un disciple digne de lui; la salle du cours restait souvent déserte le jour de sa leçon, et Newton retournait alors tranquillement à ses travaux."³ Oughtred, whose "Clavis Mathematica" was published in 1631, did not reside long at Cambridge: his secluded life is thus described by our author:—

"Although living in a country vicarage he kept up his interest in mathematics. Equally with Briggs he received one of the earliest copies of Napier's 'Canon' on logarithms, and was at once impressed with the great value of the discovery. Somewhat later in life he wrote two or three works. He always gave gratuitous instruction to any who came to him, provided they would learn to 'write a decent hand.' He complained bitterly of the penury of his wife, who always took away his candle after supper, 'whereby many a good motion was lost and many a problem unsolved'; and one of his pupils who secretly gave him a box of candles earned his warmest esteem. He is described as a little man, with black hair, black eyes, and a great deal of spirit. Like nearly all the mathematicians of the time, he was somewhat of an astrologer and alchemist. He died at his vicarage of Albury in Surrey on June 30, 1660."⁴

Mr. Ball leaves us in doubt as to the nature of the "two or three works" written "somewhat later in life" by Oughtred. Fortunately we are able to supply this omission from an old book⁵ on our shelves, which says that

¹ "Notices of English Mathematical and Astronomical Writers between the Norman Conquest and the Year 1600." This important article appeared anonymously in the Companion to the Almanac for 1837, but was undoubtedly written by De Morgan, and in fact was claimed by him six years afterwards.

² Ball, p. 37. In referring to the work before us, both here and subsequently, for brevity we cite only the author's name and the number of the page.

³ "Les Fondateurs de l'Astronomie Moderne" (8vo, Paris, n.d.) p. 303.

⁴ Ball, p. 30.

"Lord Napier, in 1614, publishing at Edinburgh his 'Mirifici logarithmorum canonis descriptio, ejusque usus in utraque trigonometria, &c.,' it presently fell into the hands of Mr. Briggs, then geometry-reader of Gresham College in London; and that gentleman, forming a design to perfect Lord Napier's plan, consulted Oughtred upon it; who probably wrote his 'Treatise of Trigonometry' about the same time, since it is evidently formed upon the plan of Lord Napier's 'Canon.' In prosecuting the same subject, he invented, not many years after, an instrument, called 'The Circles of Proportion.' . . . All such questions in arithmetic, geometry, astronomy, and navigation, as depended upon simple and compound proportion, might be wrought by it; and it was the first sliding rule that was projected for those uses, as well as that of gauging."

Authorities differ as to the day of Oughtred's death: thus the "Penny Cyclopædia" makes it happen on "Jan. 30th" (a misprint, probably, for the same day of June); in the article just quoted it is "about the beginning of May"; and in the historical introduction to Hammond's "Algebra"⁶ we read that "he lived to the Age of Four-score and Seven, and died then of Joy, on May 1, 1660, at hearing the House of Commons had voted the King's Return."

One circumstance compels us to reject this account: we cannot understand how Oughtred, living in the neighbourhood of Guildford, could know what took place in Parliament, on May 1, before the next day. But the mere fact of his death being currently attributed to such a cause illustrates so well the intense political excitement of the times in which he lived that it ought not to be passed over in silence. It is of more value than many boxes of candles.

From the time of Newton down to the beginning of the present century, mathematics (though diligently studied) made very little progress, either at Cambridge or in other parts of England. In Cambridge this was due to the excessive reverence paid to authority; at first by all, and afterwards by those "senior members of the senate, who regarded any attempt at innovation as a sin against the memory of Newton,"⁷ and who were the worthy successors of the Cambridge dons described by Pope, in 1742, as

"A hundred head of Aristotle's friends."⁸

We may be mistaken, but we strongly suspect that one of them was William Farish (b. 1759, d. 1837), whose memory is embalmed in the following extract:—

"He is celebrated in the domestic history of the University for having reduced the practice of using Latin as the official language of the schools and the University to a complete farce. On one occasion, when the audience in the schools was unexpectedly increased by the presence of a dog, he stopped the discussion to give the peremptory order, *Verte canem ex*. At another time one of the candidates had forgotten to put on the bands which are

⁵ As no edition of this work is mentioned by De Morgan in his "References for the History of the Mathematical Sciences," we give its title in full, as follows: "A New and General Biographical Dictionary; containing an Historical and Critical Account of the Lives and Writings of the Most Eminent Persons in every Nation; particularly the British and Irish; from the Earliest Accounts of Time to the present Period. Wherein Their remarkable Actions and Sufferings, Their Virtues, Parts, and Learning, are Accurately Displayed. With a Catalogue of their Literary Productions. A New Edition, in Twelve Volumes, greatly enlarged and improved" (8vo, London, 1784).

⁶ The third edition, 8vo. London, 1764.

⁷ Ball, p. 117.

⁸ "Dunciad," iv. 192. A note to this verse reads thus:—"The Philosophy of Aristotle had suffered a long disgrace in this learned University: being first expelled by the Cartesian, which, in its turn gave place to the Newtonian. But it had all this while some faithful followers in secret, who never bowed the knee to Baal, nor acknowledged any strange God in Philosophy."